COMPARISON OF CHANNEL MIGRATION ZONES IN PLANE-BED, POOL-RIFFLE and ANABRANCHING CHANNELS OF THE UPPER YELLOWSTONE RIVER

Montana Section AWRA Annual Meeting October 12 and 13, 2006 Chuck Dalby DNRC Water Management Bureau, Helena MT

SUMMARY

blier, methods simile to fines developed by the state of Visalraptin, a composite 100-Visalraptin and COM, with imaged in a GSD and consider to the Obliving Stores, healthcome lateral, and an enterior hazard, and an enterior hazard area (projected future lateral enterior and mass wasting over 100-year perior)—all adjusted for the disconnected migration share where mammade solutions (e.g. irigas, levees, baths, node), phylicially incidents or eliminate chained ingration. The control of the control

Agreement between the CMZ and hydraulic floodplain is due to the valley/floodplain architecture in different pomorphic channel bytes. Then bed and pool rifle channels are single thread and literally conflies by the follocent-Peciations lensters, substanting channels have one or which grains are to the properties of t

OBJECTIVES, STUDY AREAS and METHODS

- Examine the areal extent of the CMZ relative to the geologic extent of Holocene and fleistocene alluvium and relative to geomorphic channel type;
- Estimate the degree to which historic channel modification (e.g. riprap, levees) has limited the ability of the channel to migrate laterally.

STUDY AREAS

Two study areas were selected that span a range of very stable to highly unstable channel types in the Paradise valley south of Unregistor, Montesa. The Yellowstone River, in the MI Creek page 1984 to 1, the Piec Creek to Creative River's serging reflex 2 and 3 content moderably stable, post-life, and unstable, anabranching (e.g. multi-freeds) and anabranching-related channels; many reaches in this segment have been front, through use shall stable stabilization measures, from mild-freed so single-freed (e.g. post inflier) channels (Daffy and Patterner. 2003).

Prégy per distrer (2005) reviened genrophie methods for detendion et excident commons in allusire ents. Calenges extende reports ple telérate calent of televicion certain en la common de la common del la comm

ubits, Hazard Zone or area not included in the HMZ that is at risk of avulsion over the eline of the CMZ,

EHA= ES + GS and ES= Erosion Setback or area at risk from future bank erosion; GS= Geotechnical Setback or area at risk from future mass wasting

Delineation of CMZ Components

Habitical Mignifice Zine MMZI.

The RMZ was defined by region to be bankful channel store of study segments in 1988, 1973.

The RMZ was defined by region to be bankful channel store of study segments in 1988, 1973.

The RMZ was defined by region to be bankful channel store of study segments in 1988, 1973.

The RMZ was defined by region to be bankful channel store of the study segments in 1988, 1973.

The RMZ was defined by region to be bankful channel was the study segments in 1988, 1973.

The RMZ was defined by region to be bankful channel was the study of the study segments in 1988, 1973.

The RMZ was defined by region to be bankful channel was the study of the study segments in 1988, 1973.

The RMZ was defined by region to be bankful channel was the study of the study segments in 1988, 1973.

The RMZ was defined by region to be bankful channel was the study segment of the study segment was the study segment

The EHA consists of an Emoson Settads (ES), based on extent of future estimated lateral bank recision over the design file of the CLR (in this case, 100-years), and a Geosterinal Settads, based on the estimated extent of future mass wasting. Es was estimated using a late of the settad of the settad of the control of the settad of the se



RESULTS

Historic Channel Changes and Channel Migration Zones

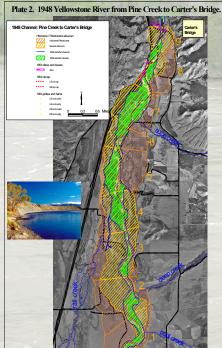
channel has a smoot platform, but physical characteristics of pane-bed channel (Pole 1, Inchmel has a smoot platform, but physical characteristics of pane-bed channel (Pole 1, Interest platform), but physical contains better platform of panel pla

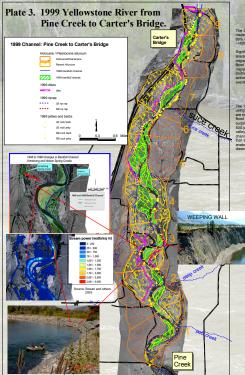


Pine Creek to Carter's Bridge Study Area

Pied Cliffe 10 Lattiff 1 Inseque autor, more than 10 Lattiff 1 Inseque autor, more than 10 Lattiff 1 Inseque autor, more than 10 Lattiff 10 Lat

In 1848 the dominant harmonic protection are major access. In 1848 the dominant harmonic power protection are major power protection and the protection are protected and forced this pooletified and plane-bed channels. Although the Doyse analysis protect, channel changes in both the 1814 and 1856 frouls were relatively large. In the least constrained segments, the amount of change caused by the 1950-78 foods were relatively large. In the least constrained segments, the amount of change caused by the 1950-78 foods were relatively large. In the clear contrained appreciation of the 1814 and 1856 for the 1814 and 1816 for the 1814 for the

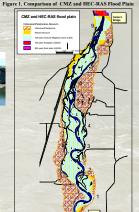


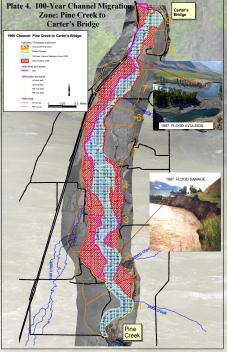


Comparison of CMZ with Extent of Holocene/Pleistocene Alluvium and Disconnected Migration Areas

(RESULTS continued)

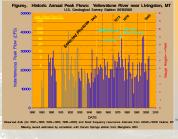


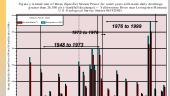




Upper Yellowstone Flood History and Channel Respons

The upper Yellowstone River deviates from the above general model of channel response to enge foods, in several ways. Channel changes in the 1974 and 1986-1997 floods counted or several response to the several response to the several response to the channel segenters in separate several response that of branch properties includes relatively regol lateral changes through available in large events (e.g. 00 to 100 year foods), which establish the domainst lateral channel configuration. Better has the several response to the sev



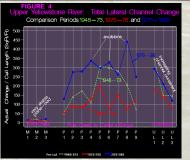


A potential imitation of historical studies of charmed change, as a basis for CMZ delimentor, is the representativeness of the factoric record, and the degree to which the channels have subjected to synthesis enough early a change of the studies record to the channels and the channels are supported to synthesis enough to the channels are supported to the channels of the channels are supported to the channels of the channels are supported to the channels of the channel of the channel of the channels of the channels of the channels of the channel of the channels of the channels of the channels of the channel of the channels of the channels of the channels of the channel of the channels of the channels of the channels of the channels of the channel of the channels of the cha

Comparison of Lateral Channel Changes 1948 to 1999

Comparison of Lateral Channel Changes 154-16 to 1999

The amount (rang) of Island channel Change (crossion pia deposition) was compiled by subdivided study segments (cells) for each of the study, areas and measurement time periods (1644-1978). 1975-1976 and 1976-1960) (laceanced changes were divided by neith engine of almost no lateral channel change from 1846-1999). There factors affect the amount of clasmost deposition in the lateral channel change from 1846-1999. There factors affect the amount of clasmost deposition of the lateral channel change from 1846-1999. There factors affect the amount of clasmost confinement due to binst, stabilization measures, and 3) the effectiveness of the channel confinement due to binst, stabilization measures, and 3) the effectiveness of the channel confinement due to binst, stabilization measures, and 3) the effectiveness of the channel confinement due to binst, stabilization measures, and 3) the effectiveness of the stability of the stabili



Daver, Z.H., K.D. Bover, and T.J. Waddle. 2003. Effects of channel modification on fain habitat in Upper Yellowson. Rover: Farst Report to the USACE, Onana. For Colina, CC: U.S. Geological Survey. Fair Costes Science Centre. URSIG Scient File Report 23 F-380 pt. 2015.

sponery, D.R. and J.M. Suffingso (1997). Channel-read morphology in no basis. Geocopal Society of America States v. 109, No. 5: o 195-411

Power, M.E. G. Parker, W.E. Dietrich, and A. Sun. 1995. How does Sociation width affect Sociations ever écology? A preliminary explication using simulations. Electrophic

